

May 5, 2021

To: The Pennsylvania Senate Democratic Policy Committee

Subject: Testimony related to Senate Bill 1285, "Legionnaires' Disease Prevention and Reporting Act"

RE: SB1285 From the 2019/20 Legislative Session

Dear: Chairwoman Muth and the honorable members of the Pennsylvania Senate Democratic Policy Committee,

I would like to thank you for the opportunity to provide written testimony in connection with the proposed legislation Senate Bill 1285 from the 2019-2020 legislative session.

My name is Jennifer Clancy. I am a microbiologist with 35+ years of experience in drinking water quality and treatment and I have worked in both the private and public sector. I was a founder and am currently the Chief Scientist of the Environmental Science, Policy & Research Institute (ESPRI), a non-profit based in Narberth, Pennsylvania (www.esprinstitute.org). ESPRI's mission is to improve public health by promoting best practices for building water systems. Building water systems include multifamily residences, hospitals, office buildings, convention centers, museums, schools, hotels, and other buildings with a significant level of public access. ESPRI's focus on building water fills a critical gap not addressed by institutions focused on best practices for drinking water, wastewater, and storm water. ESPRI promotes building water system best practices through collaboration with building water owners and managers, building occupants who use the water, drinking water utilities that supply the water, and water regulatory authorities. My CV is attached.

I have been working with *Legionella* for over 40 years. I was one of the early researchers on *L. pneumophila* and Legionnaires' disease in 1980 at the U. of Vermont Department of Medicine, shortly after the Burlington, VT outbreak linked to a cooling tower at the hospital. The NSF-funded project developed an animal model of Legionnaires' disease using guinea pigs. The work involved isolation of *L. pneumophila* from human lung tissue at autopsy, *L. pneumophila* culture, animal infectivity in guinea pigs, and animal autopsy and organ culture to determine the model of infection. I have investigated several Legionnaires' disease outbreaks and sporadic cases in hotels, apartment buildings, office buildings, and hospitals. I have been working actively through ESPRI since 2016 on: 1) development of criteria for building water management planning for *L. pneumophila* control to protect public health from water exposure leading to Legionnaires' disease; 2) conducting training for those developing and implementing building water management plans, and 3) developing communications materials for building owners and operators and water utilities to educate customers on managing *L. pneumophila* in building water systems.

The intent of Senate Bill 1285 is an important step forward in managing Legionnaires' disease, currently recognized by the US Centers for Disease Control and Prevention (CDC) as the number one waterborne disease in the US. Legionnaires' disease cases risen 800% since 2000. My comments give background for



the following suggestions to the Committee for improving the bill to meet its objective – providing for Legionnaires' disease prevention.

- 1. Legionnaires' disease occurs from exposure to water in buildings** and water systems associated with buildings (e.g., cooling towers, decorative fountains, etc.). It is well-recognized that Legionnaires' disease is transmitted by aerosols and the route of infection is inhalation of water mists that contain *Legionella pneumophila* bacteria. Disease transmission occurs when conditions are ripe for *L. pneumophila* to colonize (attach to) components in a building water system and amplify (grow). As water is used the bacteria enter the water stream and susceptible individuals can be exposed to the *L. pneumophila*, resulting in disease. Building water systems are recognized as amplifiers of *L. pneumophila* bacteria and may serve as sources for outbreaks and sporadic cases. Modern buildings with extensive water distribution and air conditioning systems which operate hot water systems at temperatures below 60°C are ideal breeding grounds for *L. pneumophila*. For control of legionellae, good building water quality management practices are required. These include identification of hazards; characterization and mitigation of risks that can cause harm; regular inspection, maintenance, and cleaning of the water system to prevent the amplification of *L. pneumophila* leading to exposure resulting in human disease.

L. pneumophila amplification occurs in biofilms, which are found on any surface exposed to microorganisms and water. Biofilms may consist of many species of bacteria, as well as fungi, algae, protozoa, debris, and corrosion products. As biofilm forms it develops a physical matrix that adheres it to the surface and allows it to exist as an ecosystem that develops its own characteristics, e.g., resistance to disinfectants. Biofilms that we encounter regularly include films or slimes on shower fixtures. Biofilms also form on natural surfaces. Slime on rocks in streams and tooth plaque are examples. By their nature biofilms cannot be eliminated, but can be controlled by physical removal, e.g., with teeth, daily toothbrushing and flossing with periodic dental care manages biofilms to prevent tooth decay and gum disease.

Control of *Legionella* and other biofilm waterborne pathogens including *Pseudomonas aeruginosa* and nontuberculous mycobacteria to reduce exposure and prevent disease is through water management planning and implementation of those plans.

- 2. Water management planning** is key to control of *L. pneumophila* in building water systems and reduction of risk from Legionnaires' disease. Water quality can degrade rapidly when it enters a building for many reasons. The building by its nature is a unique ecosystem, vastly different from the pipes and tanks and conditions in the public water supply. Microorganisms that are part of the natural flora, such as *L. pneumophila*, may be present in low and intermittent levels, and can colonize and become established in biofilms in the building. Unless there is a program to actively manage water quality in the building, amplification of these bacteria and dissemination through aerosols can occur and lead to infection in susceptible hosts. Legionnaires' disease occurs when building water quality is not actively managed through water management planning.

The standard used in the US for development of building water management plans is "ANSI/ASHRAE 188 - Legionellosis: Risk Management for Building Water Systems" (ANSI/ASHRAE, 2018). By its definition, the standard recognizes that building water systems (and not drinking water distribution systems) are the source of *Legionella* exposure and Legionnaires' disease. ASHRAE 188 provides guidance on how to identify and control hazards to minimize risks through managing both chemical and physical conditions in a building water system to minimize *Legionella* growth. SB 1285 references



ANSI/ASHRAE 188 as a standard for development and implementation of a building water management plan. ASHRAE developed a second document, ASHRAE Guideline 12-2020 Managing the Risk of Legionellosis Associated with Building Water Systems, that provides additional information on the scientific considerations and practices for the prevention of legionellosis and can be used for implementing ANSI/ASHRAE 188.

In 2016, due to the occurrence of Legionnaires' disease in health care facilities, the CDC issued guidance on how to develop and implement water management plans to control *Legionella* – “Developing a Water Management Program to Reduce Legionella Growth & Spread in Buildings: A Practical Guide to Implementing Industry Standards”. Referred to as the CDC Toolkit, it uses ANSI/ASHRAE 188 and ASHRAE Guideline 12 to guide hospitals and health care facilities in developing and implementing water management plans for *Legionella* control.

In 2017 the Centers of Medicare and Medicaid Services (CMS) published the “Requirement to Reduce Legionella Risk in Healthcare Facility Water Systems to Prevent Cases and Outbreaks of Legionnaires' Disease (LD)” (CMS, 2017). This document states that “CMS expects Medicare certified healthcare facilities to have water management policies and procedures to reduce the risk of growth and spread of *Legionella* and other opportunistic pathogens in building water systems”..... Healthcare facilities are expected to comply with CMS requirements to protect the health and safety of its patients. Those facilities unable to demonstrate measures to minimize the risk of LD are at risk of citation for non-compliance with the CMS Conditions of Participation. Accrediting organizations will be surveying healthcare facilities deemed to participate in Medicare for compliance with the requirements listed in this memorandum, as well, and will cite non-compliance accordingly.” The CMS requirements reference ANSI/ASHRAE 188 and the CDC toolkit.

There is another guidance document that I use in my work concerning development and implementation of water management plans, which is the European Technical Guidelines for the Prevention, Control, and Investigation of Infections Caused by *Legionella* species (2017). The EU Guideline is consistent with ASHRAE 188, but I prefer this document because it provides a how-to roadmap and more detail on each step of the process. It is much more user friendly for those who will eventually implement the plan in their facilities. ESPRI recently completed a guidance document for the US Navy Bureau of Medicine for development of water management plans and relied on the EU Guideline. Unlike US standards and guidances, the EU document provides action levels and actions to take when certain levels of *Legionella* are observed. The EU and other European countries mandate testing for control of *Legionella* in building water systems. An issue with current US guidances is the omission of *Legionella* testing and action levels. Without this type of guidance building owners and operators do not have clear direction on water quality goals.

Many guidance documents can serve as the basis for water management plan development and implementation. ANSI/ASHRAE 188 specifically states that there is no accreditation needed to use the standard. As noted above, the EU guideline provides detailed information on how to develop and implement a water management plan. There are many experienced practitioners in the field that do water management planning well, and there is no need to restrict the practice to those that have paid to be certified to the ASSE 12080 minimum qualifications.

- 3. *Legionella pneumophila* testing** is necessary to manage building water quality to prevent Legionnaires' disease. *Legionella pneumophila* testing is necessary to manage building water quality to prevent Legionnaires' disease. Water Management Plan validation is required in ANSI/ASHRAE 188



but *Legionella* testing is not mandated in the standard or those documents that rely on that standard. However, industry best practice shows that the only way to fully understand building water quality in terms of *L. pneumophila* occurrence is to sample the water and test for *L. pneumophila*. Nearly 98% of Legionnaires' disease cases in the US are caused by *L. pneumophila* and this species should be the focus of water Validation testing.

Buildings should be sampled and tested for *L. pneumophila* when conducting the initial site assessment for development of a water management plan to establish baseline data, and at regular intervals specified in the plan as part of the plan validation. Microbiological testing, by its retrospective nature, is not used as a control measure for water quality. It is used to validate that the control measures in the water management plan are effective.

4. **The Pennsylvania Department of Environment Protection (PADEP) increased the requirements for disinfectant residuals** in public drinking water systems in 2018. The PADEP published a revised Disinfection Requirements Rule (DRR) in the PA Bulletin on April 28, 2018 (25 PA Code Ch 109) which set new requirements for maintaining a disinfectant residual in public drinking water systems. ESPRI scientists and engineers worked closely with water utilities, stakeholders, and the DEP in reviewing the science to develop the new regulation. The USEPA is now in the process of revising the Surface Water Treatment Rule to enact requirements at the federal level. Senate Bill 1285 does not need to address disinfectant residual in drinking water systems.
5. **Increased public communication** on Legionnaires' disease is recognized within the water community as an important aspect in protecting public health. To that end, the American Water Works Association and the Water Research Foundation have developed communication materials specifically targeted to water utility customers about Legionnaires' disease. I am a co-author of the Water Research Foundation report which is widely utilized by water utilities to provide Legionnaires' disease information that is understandable to the public. As buildings were shut down or experienced low water use due to COVID-19, many organizations (USEPA, CDC, ESPRI, universities, etc.) stepped forward and provided information on their websites on how to flush stagnant water from buildings to reduce exposure to *L. pneumophila* and other waterborne pathogens that can grow as water stagnates in building plumbing. Senate Bill 1285 can reference these materials that have been developed by water experts specifically as public education materials.

Conclusion

Thank you for the opportunity to provide comments on Senate Bill 1285. I have been a water quality professional for over 35 years, dedicated to protecting and improving public health through my research and practice. I am pleased to see Senate Bill 1285 address Legionnaires' disease as it is a preventable disease through proper water management practices. To protect public health, I suggest the following:

1. Focus Senate Bill 1285 on water management planning and implementation using any of the widely accepted consensus documents. The National Academies of Science, Engineering and Medicine (2019) recommended that water management plans be a requirement for all public buildings.
2. Focus testing on *L. pneumophila* as it is the primary species responsible for Legionnaires' disease.
3. Remove requirements on disinfectant residuals as PADEP has already strengthened the rules and federal regulation is currently addressing a review on this topic.



4. Use communications materials already developed by scientists, public health professionals and communication professionals to educate consumers on Legionnaires' disease risks.

If you have any questions, please do not hesitate to contact me.

Sincerely yours,



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Chief Scientist, ESPRI

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